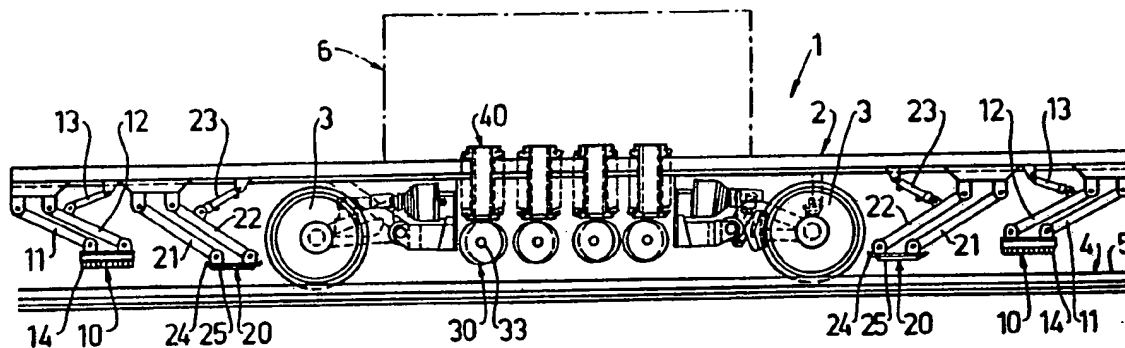




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: **METHOD AND DEVICE FOR CLEANING OF RAILS**



## (57) Abstract

The invention relates to a method and a device for cleaning the top surfaces (5) of rails (4). A vehicle (1) carried on rail and comprising scraping means (10), loosening means (20) and rotatable brush means (30) is used. In case of a wet rail (4) the scraping means (10) are used to make the top surfaces (5) of the rails (4) dry. The loosening means (20) are used to loosen up encrustments located on the top surfaces (5) of the rails (4) after which said encrustments are removed by the aid of the brush means (30) from the top surfaces (5) of the rails (4). The scraping means (10) and the loosening means (20) are carried by slewing brackets (11, 12 and 21, 22, respectively) connected with the chassis (2) of the vehicle and the brush means (30) are carried by telescopic means (40) connected to the chassis (2) of the vehicle (1), said means (10, 20, 30) being operable between an inactive position of repose and an active working position. The vehicle (1) is so embodied that it can be used for cleaning of rails in both directions of travel.

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### Method and Device for Cleaning of Rails

This invention relates to a method and a device for cleaning the top surfaces of rails.

In connection with leaves and other parts of plants falling down on railway rails a problem difficult to master will arise. The leaves and the other particles contribute to a lubricating film being formed on the rail with the result that the tractive ability of a locomotive is reduced due to skidding between the drive wheels of the locomotive and the contact surface of the rail arising. As a consequence of this it may be necessary to double the locomotive to manage propulsion of a certain train set. Due to leaves and particles covering the tread surface of the rail the braking distance of the train set will also increase. There is also a risk that the wheels of the locomotive and the trucks lock in braking with the result that the tread surfaces of the wheels will be partially flattened out and consequently destroyed, the consequence unfortunately being, in turn, that expensive and time-consuming repairing measures must be taken.

Thus, there is a need to achieve cleaning of the tread surface of the rail in an efficient manner, and it is the object of this invention to provide a method and a device for cleaning the tread surface of the rail efficiently. This object is achieved in that the method and the device have been given the characteristic features defined in the claims.

Illustrative examples of the invention will be described in greater detail below with reference to the enclosed drawings, in which Fig. 1 is a schematic lateral view of a device according to the invention, Fig. 2 shows schematically the mode of operation of the device in a first direction of travel, Fig. 3 shows schematically the mode of operation of the device in a second direction of travel, Fig. 4 is a schematic top plan view of the inventive device and Fig. 5 is a schematic vertical longitudinal section of a unit carrying the brush means in an exposed position and on a larger scale.

It is apparent from Figs. 1 and 4 that the inventive rail cleaning device 1 comprises a chassis 2 supporting a number of wheels 3 so designed that the device 1 is a vehicle running on rails and, thus, can be driven along for example a

railway rail, the two rails of which are designated by 4.

The device 1 further comprises a source 6 with pressure medium in the form of for example a hydraulic oil unit comprising a Diesel engine, a hydraulic oil pump and a hydraulic oil tank. The source 6 with pressure medium supplies a number of pressure medium cylinders and pressure medium motors with pressure medium.

The device 1 further comprises four scraping means 10 which are articulatedly connected to the chassis 2 via slewing brackets 11, 12, a pressure medium cylinder 13 acting between the chassis and the slewing bracket 12 to enable an individual operation of each scraping means 10 between an inactive position of repose and an active working position. The scraping means 10 comprises a number of replaceable scraping elements 14 which are preferably formed of an elastic material, for example rubber.

The device 1 further comprises four loosening means 20 which are articulatedly connected to the chassis 2 via slewing brackets 21, 22. A pressure medium cylinder 23 is arranged to act between the slewing bracket 22 and the chassis 2 to enable an individual operation of the loosening means 20 between an inactive position of repose and an active working position. The loosening means 20 comprises a plate-shaped member 24 preferably having on its underside a number of applied weld beads 25 which preferably extend diagonally across the plate 24.

In the illustrative example shown the device 1 comprises eight reversibly rotatable brush means 30 which are operable by means of a telescopic device 40 between an inactive position of repose and an active working position. The rotatable brush means 30 preferably comprise rolls provided with brushes, so-called circular brushes which preferably comprise a lot of brush wires 31 of metal, for example steel, or of a plastic material. However, it should be appreciated that other suitable brush means are also possible to use. A pressure medium motor 32, for example a hydraulic motor, is arranged at each brush means 30 which motor is reversibly rotationally operable so that each brush means 30 can be rotated as desired in an arbitrary direction about its rotary shaft 33. In order to obtain the best possible cleaning result for the rail the

brush means 30 are somewhat inclined so that the sweeping direction of the brush means deviate a little (for example 10°) from the longitudinal direction of the rail, said inclination preferably being varied in different directions as best apparent from Fig. 4.

The brush means 30 are carried by a telescopic device 40, the structure of which is shown more closely in Fig. 5. The telescopic device 40 comprises an outer tube 41 preferably having a rectangular form and an inner tube 42 of a corresponding form. The outer tube 41 is sealed at its upper end by means of a plate 43 and the inner tube 42 is sealed at its lower end by means of a plate 44. The outer tube 41 is placed at the chassis 2 of the device, as indicated in Figs. 1 and 4. About the rotary shaft 33 the brush means 30 is rotatably connected to the plate 44 and the pressure medium motor 32 is also supported by the plate 44. Means exerting force in the form of for example tensile springs 45 act between the plate 43 and the plate 44, said tensile springs always tending to contract the telescopic device 40 to the position in Figs. 1 and 5 where it is brought together and, thus, the brush means are in a hoisted inactive position. Within the telescopic device 40 there is arranged a pressure medium cylinder 46, the cylinder of which is disposed at the outer tube 41 (at 47) and the piston rod 49 of which is connected to the inner tube 42 (at 48). Of course the tubes 41 and 42 have recesses enabling said connections and enabling upon activation of the cylinder 46 that its piston rod 49 can move outwards from the cylinder and expand the telescopic device 40 so that the brush means 30 can be set at the desired contact pressure against the top surface 5 of the rail 4, said brush means 30 being in its active working position. When the telescopic device 40 is again to be moved to contracted position the pressure on the cylinder 46 is unloaded, and the springs 45 will be able to contract the telescopic device to the position shown in Figs. 1 and 5. As to the cylinder 46 this can thus, if desired, be single-acting with or without spring return, but the cylinder 46 can also be double-acting, there being a possibility of omitting the tensile springs 45 and, thus, also using the cylinder 46 for bringing together the telescopic device. An-

other possibility is to have the dead weight of the brush means, the hydraulic motor and the inner tube of the telescopic device etc. expand the telescopic device, a pressure medium cylinder being used for contracting the telescopic device and optionally adjusting the contact pressure of the brush means against the top surface of the rail. Thus, there are several alternatives and of course it is also possible to place the cylinder or cylinders outside the outer tube 41 and to place one or more tensile springs within the inner tube 42.

The device 1 of the invention operates and functions as follows. It is as feasible to use the device 1 in both directions of travel and to tow it along the railway rail by means of for example a locomotive, but of course there is also a possibility of making the device running by itself by providing it with a driving motor driving its wheels.

Fig. 2 shows schematically how the device 1 operates when propelled in the direction of travel according to the arrow A, two of the scraping means 10, two of the loosening means 20 and the eight brush means 30 being set at a suitable pressure against the top surface 5 of the rails 4. The brush means 30 are preferably rotated in the direction of the arrows B. The rubber scrapers 14 of the scraping means 10 scrape the top surface 5 of the rail when the rail is wet. This means that the scraping means 10 need only be used when a wet rail is present. The loosening means 20 will loosen encrustment occurring on the top surface 5 of the rail so that this encrustment will be loosened from the rail as much as possible. The rotary brush means 30 will sweep off the particles lying on the rail so that the top surface 5 of the rail will be efficiently cleaned, said brush means sweeping diagonally across the rail in different directions.

Fig. 3 shows the mode of operation of the device 1 when propelled in a direction of travel according to the arrow C, two of the scraping means 10, two of the loosening means 20 and the eight brush means 30 being set at a suitable pressure against the top surface 5 of the rails 4. The brush means 30 are preferably rotated in a direction according to the arrows D.

It should be mentioned that the scraper means 10 and the

loosening means 20 are so arranged that they can spring away without any detrimental influence on the device 1 if they run across an obstacle on the rail enforcing such springing away.

It should be pointed out that protective shields of course should be arranged at the brush means, but such protective details, hydraulic lines and the like have not been shown on the drawings for the sake of clarification.

It will be appreciated that the scraping, loosening and brush means of course can be operated in another way than shown here, for instance by electrically actuated operating means instead of such means actuated by a pressure medium.

It will also be appreciated that there is a possibility of adjusting individually a contact pressure on each scraping, loosening and brush means.

Thus, the invention is not restricted to what has been shown and described, but amendments and modifications thereof are possible within the scope of the following claims.

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Claims

1. A method for cleaning the top surfaces (5) of rails (4), a vehicle (1) carried on rail and comprising loosening means (20) and brush means (30) being used, encrustments located on the top surfaces (5) of the rails (4) being loosened up by the aid of the loosening means (20) after which said encrustments are removed from the top surfaces (5) of the rails (4) by the aid of said brush means (30), c h a r a c t e r - i z e d in that in case of a wet rail, before loosening the encrustments by the aid of scraping means (10) comprising the vehicle (1) carried on rail, the top surfaces (5) of the rails (4) are scraped to make the top surfaces (5) of the rails (4) dry in this way.

2. The method of claim 1, c h a r a c t e r i z e d in that rotary brush means (30) are used.

3. A device for cleaning the top surfaces (5) of rails (4), said device comprising a vehicle (1) carried on rails and having loosening means (20) and brush means (30), c h a r - a c t e r i z e d in that the device also comprises scraping means (10).

4. The device of claim 3, c h a r a c t e r i z e d in that the brush means (30) are rotatably arranged and consist of rolls provided with brush wires (31).

5. The device of claim 3 or 4, c h a r a c t e r - i z e d in that the brush means (30) can be raised to an inactive position of repose and lowered to an active working position by means of telescopic devices (40).

6. The device of claim 5, c h a r a c t e r i z e d in that the telescopic devices (40) comprise an outer pipe (41) connected to the chassis (2) of the vehicle (1) and an interior pipe (42) connected to the brush means (30) and that means (45, 46) exerting a force are arranged to act between said pipes (41, 42).

7. The device of any one of claims 3-6, c h a r - a c t e r i z e d in that the loosening means (20) and the scraping means (10) are pivotably connected to the chassis (2) of the vehicle (1) via slewing brackets (21, 22 and 11, 12, respectively) and that means exerting a force (23 and 13, respectively) are arranged to act between the chassis (2) and



at least certain of the slewing brackets (22 and 12, respectively) to move the loosening means (20) and the scraping means (10) between an inactive position of repose and an active working position.

- 5           8. The device of any one of claims 3-7,   c h a r -  
a c t e r i z e d   in that the loosening means (20) comprise  
a plate (24) provided on its underside with applied weld beads  
(25).

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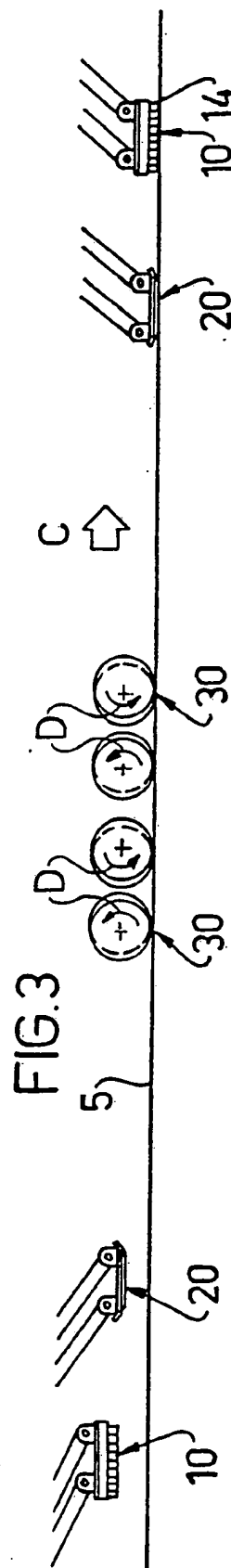
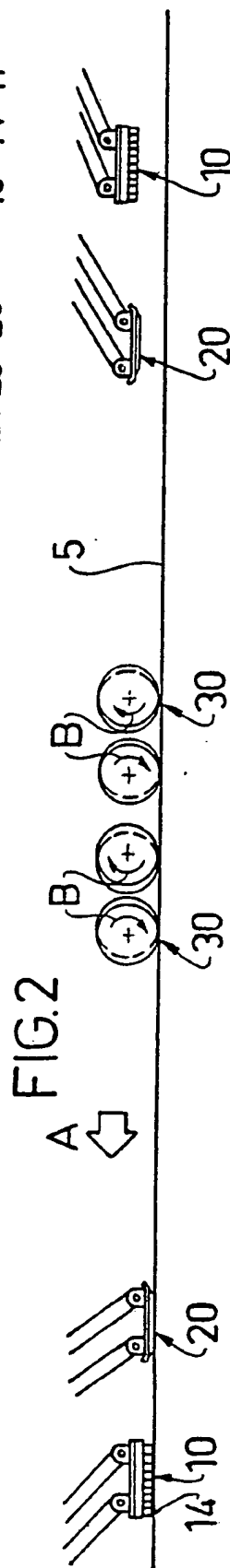
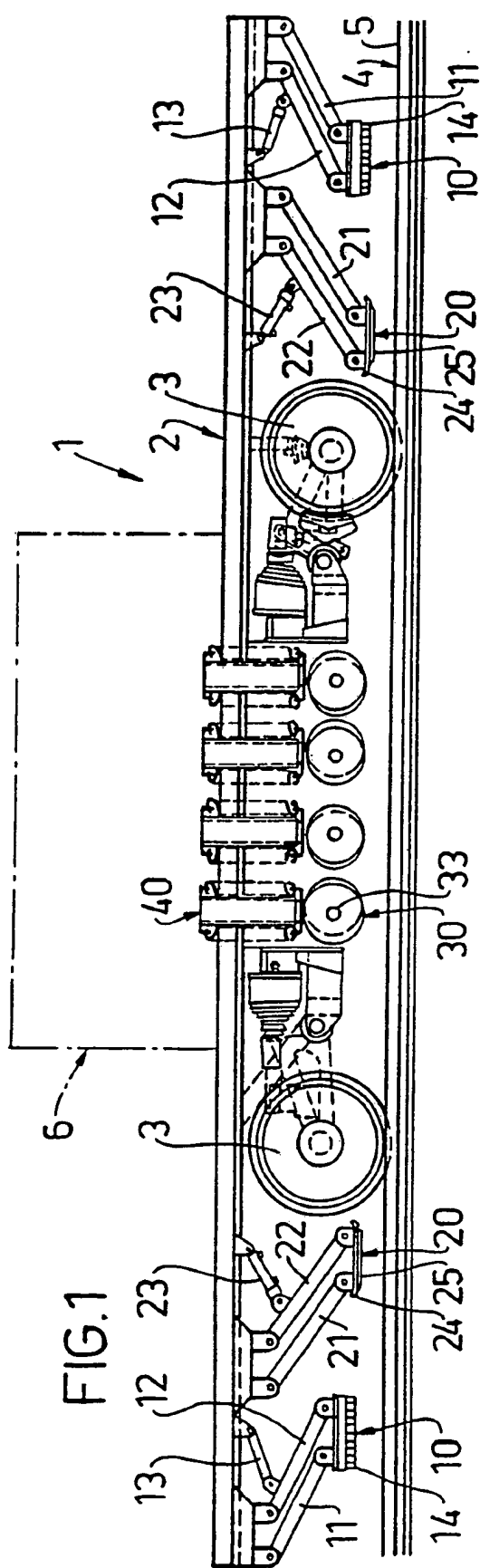


FIG. 4

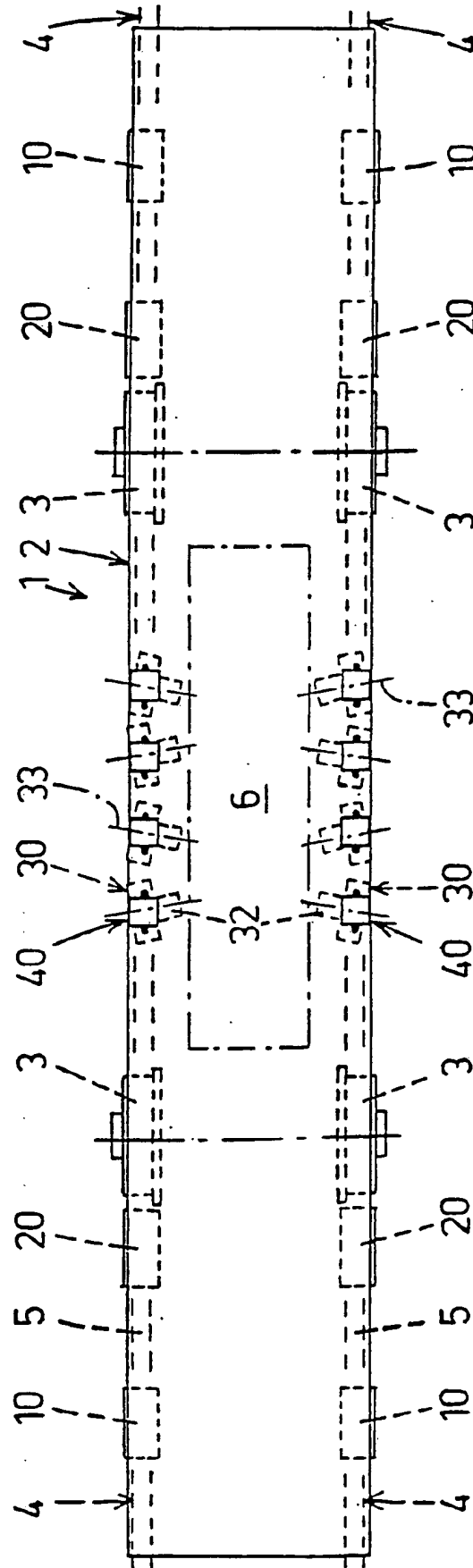
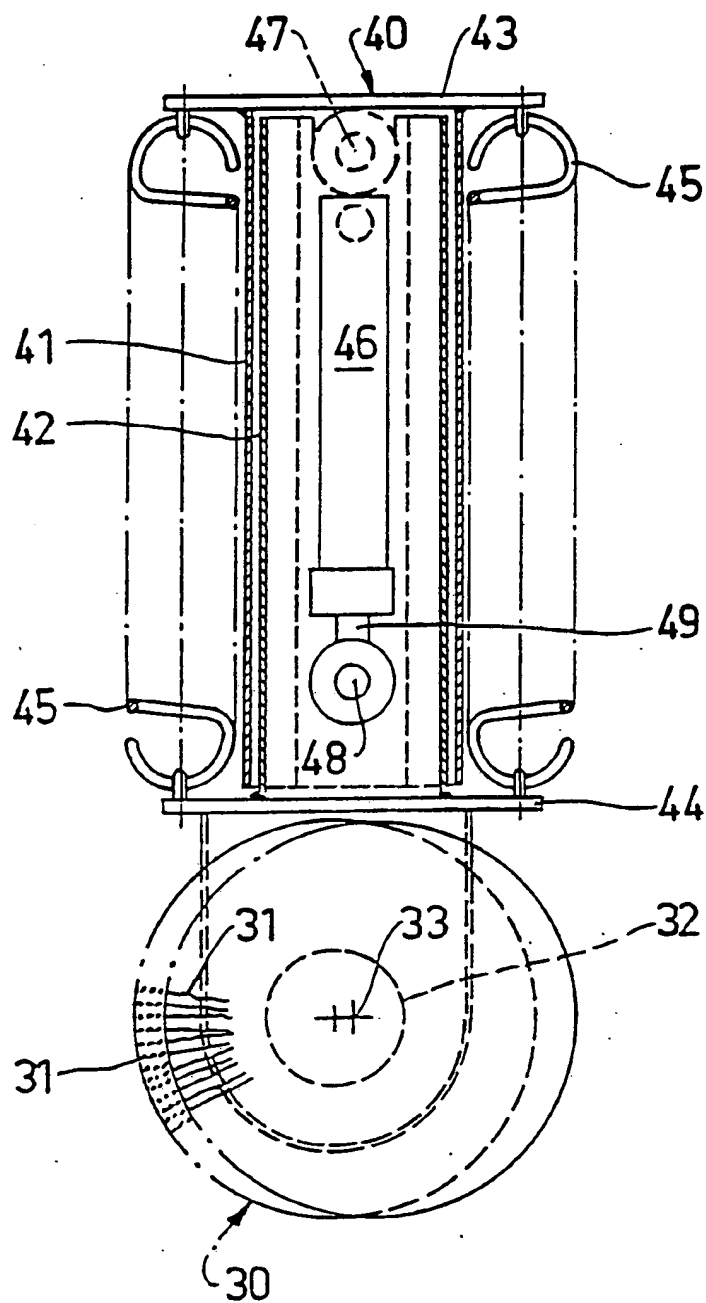



FIG. 5



SUBSTITUTE SHEET

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE88/00234

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC 4		
E 01 H 8/10, E 01 B 31/00		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched ?		
Classification System	Classification Symbols	
IPC 4	E 01 B 31/00, /02; E 01 H 8/00, /10, /12	
US C1	15: 54, 55	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>		
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages **	Relevant to Claim No. **
Y	US, A, 626 039 (JOHN H ROBERTSON) 30 May 1899 The whole document	1,2,4,5
Y	DE, C, 138 080 (FLORIAN KRAJCA AND C F RIETHER) 20 April 1901 The whole document	1,2,4,5
Y	DE, C, 959 106 (EDUARD GAUTZSCH ET AL) 28 February 1957 Fig 4	1,6
Y	US, A, 2 505 501 (ROBERT N MILLER ET AL) 25 April 1950 Fig 8, 13	1,2,3,4,5
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